REMARKS

The Claims

Claims 1 to 3, 5, 9, 13 to 17 and 20 to 23 were amended to replace "food" with --instant fried noodles--. This amendment is supported in the specification on page 14, lines 20 to 21.

The amendment to claims 1 and 15 regarding "noodle dough" is supported by Examples 1, 3, 5 to 8, 10, 13 and 14 in the specification.

The amendment to claims 1 and 5 concerning "strands of noodles" is supported in the specification by Examples 2, 4, 9, 11 and 12.

Claims 1 to 3, 5, 9, 14 to 16 and 20 to 23 are directed to a method of preparing instant fried noodles, and claims 13 and 14 are directed to instant fried noodles prepared by the method.

Claims 18, 19 and 24 to 31 are directed to a method of decreasing an acrylamide content of food, and claims 32 and 33 are directed to instant fried noodles prepared by the method.

New claims 24 and 25 are supported in the specification by the following Examples and Tables:

glycine (Examples 1, 13, 15, 18 and 32);

taurine (Examples 5, 12, 17, 26 and 43, and Table 9 on page 58 of the specification);

β-alanine (Example 6, and Table 9 on page 59 of the specification);

γ-aminobutyric acid (Example 7, and Table 9 on page 59 of the specification);

L-lysine hydrochloride (Examples 21 and 38, and Table 9 on page 58 of the specification);

L-hystidine (Example 23);

L-proline (Example 24);

L-lysine L-glutamate (Example 28, and Table 9 on page 58 of the specification);

L-cysteine hydrochloride (Examples 32 and 37, and Table 9 on page 58 of the specification);

ornithine hydrochloride (Table 10 on page 59 of the specification);

polylysine (Example 29); and

glutathione (Table 9 on page 58 of the specification).

New claims 26 to 29 recite specific foods. These specific foods are supported by original claims 7 and 8, and Examples 1 to 31 of the specification. Specifically, instant fried noodles are supported by Examples 1 to 14. Ageyakisoba (fried and pan-broiled noodles) is supported by Examples 18 to 29, and page 14, lines 22 to 23; page 15, lines 16 to 22 and page 40, lines 19 to 20 of the specification. Kakiage (a deep-fried mixture of ingredients containing vegetable and fish) is supported by Examples 15 to 17 and page 33, lines 19 to 20 of the specification. Biscuits are supported by Example 33 of the specification. Potato chips are supported by Example 32 of the specification. A fried potato is supported by Examples 34 to 46 and page 15, lines 2 to 3 of the specification. Agegyouza (a fried dumpling stuffed with minced pork) is supported by Examples 30 to 31, and page 15, lines 5 to 6 and page 45, lines 13 to 14 of the specification.

In new claims 30 to 33, the "food" is defined as instant fried noodles.

With respect of Rule 116, entry of the above amendments and new claims is respectfully requested, since such amendments and new claims address issues raised in the final rejection.

The Rejections

Claims 1, 2, 4, 7, 9 to 10, 12 to 15 and 17 to 23 were rejected under 35 USC 102 as being anticipated by Kuechle et al. (USP 6,436,458) for the reasons stated on page 2 of the Office Action.

Claims 3, 5 to 6, 8, 11 and 16 were rejected under 35 USC 103 is being unpatentable over Kuechle et al. for the reasons indicated in the first and second paragraphs on page 3 of the Office Action.

It was admitted in the Office Action that Kuechle et al. do not disclose heating that is not lower than 120°C; frying, stir-frying or roasting; the salt of claim 3; and preparing cooked food.

Rebuttals to Positions Taken in the Office Action

In the Office Action on page 3, lines 4 to 5 from the bottom, the following was stated: "Kuechle et al. disclose both amino acids and protein can be added." However, although Kuechle et al. disclose the addition of protein, **Kuechle et al. make no mention of the addition of amino acids.** In this respect, the characterization of Kuechle et al. in the Office Action is not correct.

The position is taken in the Office Action that Kuehcle et al. disclose the addition of amino acids to food dough, based on column 4, lines 50 to 55 of Kuechle et al., which states that "A suitable protein supplement can include proteins, resulting from amino acids such as, for example glycine...." However, **the disclosure in Kuechle et al., column 4, lines 50 to 55 lists merely the amino acids as "components" of a protein.**

Kuechle et al. do not disclose the addition of amino acids to food dough based on the following definitions of a "protein" and an "amino acid."

(i) A protein is a high molecular compound in which amino acids are connected together by peptide bonds. In general, a protein has a molecular weight of several tens of thousands to several hundreds of thousands, whereas an amino acid has a molecular weight of about 100 to 200.

(ii) Since a protein is a high molecular compound, a protein forms a steric structure called a "higher-order structure," which can exhibit an enzymatic activity. In contrast to a protein, an amino acid is a single molecule and therefore an amino acid cannot form a steric structure, making it impossible to exhibit an enzymatic activity.

(iii) The peptide bond of a protein is a covalent bond, which is very strong, and thereore when added to food, a protein is not degraded into amino acids during cooling with heat. Thus, in Kuechle et al, the protein added to food is not degraded into amino acids by cooking with heat. It is clear that a protein in food is not degraded into an amino acid by cooking with heat, from the fact that people are able to ingest proteins

from heat-cooked foods such as heat-cooked meat, eggs and the like.

As further evidence of the definitions of a "protein" and an "amino acid," enclosed are copies of pages 9 and 203 of A Concise Dictionary of Biology (1990) which define the terms "amino acid" and "protein."

On page 4, lines 5 to 6 of the Office Action, the following is stated:

> "the showing (in the declaration) is not against the prior art because Kuechle et al. teach proteins resulting from amino acids and the amino acids are the same as claimed."

However, as explained above, a protein and an amino acid are not substantially different from each other. Further, Kuechle et al. disclose in column 4, the last paragraph, gluten and whey protein as examples of a protein. In the DECLARATION UNDER 37 CFR 1.132 of Tomo TAKAYAMA dated November 7, 2005, it was shown that wheat gluten and milk protein (i.e., whey protein) are not effective for decreasing the content of acrylamide. Therefore, in the November 7, 2005 TAKAYAMA DECLARATION, the present claims

and Kuechle et al. are compared against each other and contrasted with each other.

The following allegation is set forth at the middle of page 4 of the Office Action: "It is not shown how the acrylamide is measured and compared in the declaration." This is not true, since it was stated at the middle of page 4 of the November 7, 2005 TAKAYAMA DECLARATION that "the content of acrylamide was measured by the method described in the specification of the present application, page 60, line 1 to page 62, line 16.

Kuechle et al.

Kuechle et al. disclose a dough to be cooked under heat, and further describes that the dough includes a protein supplement.

Kuechle et al. describe a protein supplement, namely "a suitable protein supplement can include proteins resulting from amino acids such as ..." (see column 4, lines 49 to 58 of Kuechle et al.). Kuechle et al. discuss that the protein supplement provides "structure to the dough," and that the protein supplement provides "a crisp, brown outer surface as well as a

tender interior that is moist but not doughy" (see column 4, lines 44 to 48 of Kuechle et al.).

Differences Between the Present Claims and Kuechle et al.

In Kuechle et al., the protein supplement means "a protein resulting from twenty (20) types of amino acids. The 20 types of amino acids listed therein indicate merely components of the protein. Thus, the protein supplement of Kuechle et al. is a protein (which is a polymer formed from a great number of amino acids bonded together), and not a single molecule of an amino acid.

Working Example 1 of Kuechle et al. describes that the dough contains albumin and caseinate (both of which are proteins) (see Table 2 at the bottom of column 13 of Kuechle et al.). However, Kuechle et al. make no mention that the dough contains a single molecule of an amino acid, such as an imino acid, a sulfonic acid or a peptide molecule (i.e., the additives of the presently claimed invention). Therefore, Kuechle et al. do not disclose that their dough contains any of the additives of the present claims.

In view of the above, it is respectfully submitted that the present claims are novel.

Obviousness Rejection

(1) Applicants' Contribution to the Field of the Invention

The present inventors made a great contribution to the field of the invention. At the time the present application was filed, it was known that acrylamide is contained in a livestock feed cooked under heat, but a method of decreasing the acrylamide content in food, or specifically in instant fried noodles, was not known (see the present specification on page 2, lines 6 to 9). Also, for other kinds of food, at the time of the present invention, there was no method of effectively decreasing the acrylamide content.

In view of such a technical background, the present inventors discovered that acrylamide in a food can be effectively decreased by adding a specific additive to the food (see the present specification on page 2, line 22 to page 3, line 9). The present invention was achieved based on this discovery. Thus, it is respectfully submitted that the present claims represent an

epoch-making new technology in the respect that for the first time, the amount of acrylamide in a food product (such as instant fried noodles) can be reduced.

(2) Non-Obviousness of the Presently Claimed Invention

(i) As described above, the present invention has been achieved based on the discovery that the content of acrylamide in a food (such as instant fried noodles) can be effectively reduced by adding any one of the additives of the present claims to food (such as instant fried noodles).

As described above, Kuechle et al. do not disclose or suggest that their dough contains any of the additives of the present claims.

Therefore, it is respectfully submitted that based on the disclosure in Kuechle et al., a person of ordinary skill in the art would not arrive at the present claims, i.e., using an additive to decrease the acrylamide content in food (such as instant fried noodles). Further, it is respectfully submitted that a person of ordinary skill in the art would not be able to predict from the disclosure of Kuechle et al. the advantageous results of the present claims, namely that the content of

acrylamide in food (such as instant fried noodles) can be decreased with the use of specific additives.

(ii) Additionally, as is well known in the technical field of biochemistry, and as discussed above, a protein, unlike a single molecule of an amino acid or a peptide, exhibits its activity only if the protein forms a steric structure called the "higher-order structure." Thus, it is clear from the technical common knowledge that a protein does not exhibit the same activity as a single molecule of an amino acid, or a peptide that is a part of the structure of a protein.

In the present claims, a single molecule of an amino acid or a peptide has the advantage of decreasing the content of acrylamide in a food, whereas a protein does not decrease the acrylamide content in a food. As evidence that a protein does not decrease the content of acrylamide in a food, see the DECLARATION UNDER 37 CFR 1.132 of Tomo TAKAYAMA dated November 7, 2005, which was filed on November 21, 2005.

Thus, it is respectfully submitted that based on the disclosure of a protein in Kuechle et al., one of ordinary skill in the art would not conceive of the present claims, namely the

use of a molecule of an amino acid or a peptide to decrease the acrylamide content of food (such as instant fried noodles).

(iii) The important features of applicants' specific claims are discussed as follows:

Claims 1 to 3, 5, 9, 13 to 17 an 20 to 23

Claims 1 to 3, 5, 9, 13 to 17 and 20 to 23 are directed to instant fried noodles, which are not taught or suggested in Kuechle et al.

Claims 18, 19 and 24 to 33

Kuechle et al. do not disclose or suggest the technique of decreasing a content of acrylamide contained in a food.

Especially, the technical fact that acrylamide can be significantly reduced by the use of a particular compound and peptides recited in applicants' claims 24 and 25 is not discussed in Kuechle et al. When these compounds and peptides are added to food, the acrylamide content can be significantly reduced (more specifically, to less than 50% of the acrylamide content of comparative examples).

It is therefore respectfully submitted that applicants' claims are not anticipated and are not rendered obvious by the reference.

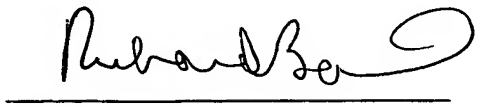
Withdrawal of the prior art rejections is therefore respectfully solicited.

Reconsideration is requested. Allowance is solicited.

Enclosed is a Form PTO-2038 in the amount of $150 in payment of three additional total claims.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



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Encs.: (1) Pages 9 and 203 of A Concise Dictionary of Biology (1990)
(2) Form PTO-2038

A Concise Dictionary of Biology

NEW EDITION

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amber). It occurs throughout the world in rock strata from the Cretaceous to the Pleistocene, but most commonly in Cretaceous and Tertiary rocks.

amino acid Any of a group of water-soluble organic compounds that possess both a carboxyl (–COOH) and an amino ($-NH_2$) group attached to the α-carbon atom. Amino acids can be represented by the general formula $R-CH(NH_2)COOH$. R may be hydrogen or an organic group and determines the properties of any particular amino acid. Through the formation of peptide bonds, amino acids join together to form short chains (*peptides) or much longer chains (*polypeptides). Proteins are composed of various proportions of about 20 commonly occurring amino acids (see table). The sequence of these amino acids in the protein polypeptides determines the shape, properties, and hence biological role of the protein. Some amino acids that never occur in proteins are nevertheless important, e.g. *ornithine and citrulline, which are intermediates in the urea cycle.

Plants and many microorganisms can synthesize amino acids from simple inorganic compounds, but animals rely on adequate supplies in their diet. The *essential amino acids must be present in the diet whereas others can be manufactured from them.

amino sugar Any sugar containing an amino group in place of a hydroxyl group. The *hexosamines* are amino derivatives of hexose sugars and include *glucosamine* (based on glucose) and *galactosamine* (based on galactose). The former is a constituent of *chitin and the latter occurs in cartilage.

ammonite An extinct aquatic mollusc of the class *Cephalopoda. Ammonites were abundant in the Mesozoic era (225–65 million years ago) and are commonly found as fossils in rock strata of that time, being used as *index fossils for the Jurassic period. They were characterized by a coiled shell divided into many chambers, which acted as a buoyancy aid. The external suture lines on these shells increased in complexity with the advance of the group.

amniocentesis The taking of a sample of amniotic fluid from a pregnant woman to determine the condition of an unborn baby. A hollow needle is inserted through the woman's abdomen and wall of the uterus and the fluid drawn off. Chemical and microscopical examination of cells shed from the embryo's skin into the fluid are used to detect spina bifida, *Down's syndrome, or other serious biochemical or chromosomal abnormalities.

amnion A membrane that encloses the embryo of reptiles, birds, and mammals within the *amniotic cavity*. This cavity is filled with *amniotic fluid*, in which the embryo is protected from desiccation and from external pressure. *See also* extra-embryonic membranes.

amniote A vertebrate whose embryos are totally enclosed in a fluid-filled sac – the *amnion. The evolution of the amnion provided the necessary fluid environment for the developing embryo and therefore allowed animals to breed away from water. Amniotes comprise the reptiles, birds, and mammals. *Compare* anamniote.

Amoeba A genus of *Protozoa, members of which have temporary body projections called *pseudopodia. These are used for locomotion and feeding and result in a constantly changing body shape. Most species are free-living in soil, mud, or water, where they feed on smaller protozoans and single-celled plants, but a few are parasitic. The best known species is the much studied *A. proteus*.

cyclin causes blood vessels to dilate. Prostaglandins are also involved in inflammation, being released from affected tissues. *See also* aspirin.

prostate gland A gland in male mammals that surrounds and opens into the urethra where it leaves the bladder. During ejaculation it secretes a fluid into the semen that activates the sperms and prevents them from sticking together.

prosthetic group A tightly bound nonpeptide inorganic or organic component of a protein. Prosthetic groups may be lipids, carbohydrates, metal ions, phosphate groups, etc. Some *coenzymes are more correctly regarded as prosthetic groups.

protamine Any of a group of proteins of relatively low molecular weight found in association with the chromosomal *DNA of vertebrate male germ cells. They contain a single polypeptide chain comprising about 67% arginine. Protamines are thought to protect and support the chromosomes.

protandry 1. The condition in which the male reproductive organs (stamens) of a flower mature before the female ones (carpels), thereby ensuring that self-fertilization does not occur. Examples of protandrous flowers are ivy and rosebay willowherb. *Compare* protogyny; homogamy. *See also* dichogamy. 2. The condition in some hermaphrodite or colonial invertebrates in which the male gonads or individuals are sexually mature before the female ones. *Compare* protogyny.

protease (peptidase; proteinase; proteolytic enzyme) Any enzyme that catalyses the splitting of proteins into smaller *peptide fractions and amino acids, a process known as *proteolysis*. Examples are *pepsin and *trypsin. Several proteases, acting sequentially, are normally required for the complete digestion of a protein to its constituent amino acids.

protein Any of a large group of organic compounds found in all living organisms. Proteins comprise carbon, hydrogen, oxygen, and nitrogen and most also contain sulphur; molecular weights range from 6000 to several million. Protein molecules consist of one or several long chains (*polypeptides) of *amino acids linked in a characteristic sequence. This sequence is called the *primary structure* of the protein. These polypeptides may undergo coiling or pleating, the nature and extent of which is described as the *secondary structure*. The three-dimensional shape of the coiled or pleated polypeptides is called the *tertiary structure*. *Quaternary structure* specifies the structural relationship of the component polypeptides.

Proteins may be broadly classified into globular proteins and fibrous proteins. Globular proteins have compact rounded molecules and are usually water-soluble. Of prime importance are the *enzymes, proteins that catalyse biochemical reactions. Other globular proteins include the *antibodies, which combine with foreign substances in the body; the carrier proteins, such as *haemoglobin; the storage proteins (e.g. *casein in milk and *albumin in egg white), and certain hormones (e.g. *insulin). Fibrous proteins are generally insoluble in water and consist of long coiled strands or flat sheets, which confer strength and elasticity. In this category are *keratin and *collagen. Actin and myosin are the principal fibrous proteins of muscle, the interaction of which brings about muscle contraction. *Blood clotting involves the fibrous protein called fibrin.

When heated over 50°C or subjected to strong acids or alkalis, proteins lose their specific tertiary structure and may form insoluble coagulates (e.g. egg white). This usually inactivates their biological properties.